

What is claimed is:

1. A method of correcting an audio level of a stored program asset,
comprising:
retrieving a stored program asset, the asset having audio encoded at a first
loudness setting;
identifying dialog of the audio of the asset;
determining a loudness of the dialog;
comparing the determined loudness to the first loudness setting; and
re-encoding the asset at a second loudness setting corresponding to the
second loudness, if the first loudness setting and the determined loudness are different by more
than a predetermined amount.
2. The method of claim 1, wherein the audio is encoded at a DIALNORM
setting, the method comprising:
determining a loudness of the dialog, wherein the determined loudness is a
DIALNORM of the dialog.
3. The method of claim 1, comprising identifying the dialog by:
dividing the audio into time intervals;
determining a loudness of each time interval; and
identifying time intervals with intermediate loudnesses.
4. The method of claim 3, comprising:
determining the loudness of each time interval based on psycho-acoustic
criteria.

5. The method of claim 4, comprising:
determining the loudness of each time interval based on $L_{eq}(A)$.
6. The method of claim 3, further comprising:
discarding time intervals with high and low loudnesses.
7. The method of claim 3, comprising:
identifying time intervals with intermediate loudnesses by creating a histogram of the loudnesses of the intervals.
8. The method of claim 3, further comprising:
determining a loudness of the time intervals having an intermediate loudness.
9. The method of claim 8, comprising determining the loudness of the time intervals having intermediate loudnesses by:
computing a function of the loudnesses of the time intervals having intermediate loudness.
10. The method of claim 9, wherein:
the function is an average, a mean or a median of the loudnesses of the time intervals having intermediate loudness.
11. The method of claim 8, wherein determining the loudness of the time intervals having intermediate loudnesses comprises:
determining a DIALNORM of the time intervals having intermediate loudnesses.

12. The method of claim 1, further comprising:
correcting compression of the audio of the program.
13. The method of claim 1, further comprising, prior to retrieving the stored
program asset:
receiving a program from a source; and
storing the program in memory as an asset for later transmission.
14. The method of claim 1, further comprising:
demultiplexing the audio from the program asset, prior to identifying the
dialog.
15. The method of claim 1, further comprising:
decompressing the audio, prior to identifying the dialog.
16. The method of claim 15, further comprising:
decompressing the audio by converting the audio to a pulse coded
modulation format.
17. The method of claim 1, further comprising:
performing automatic gain control on the audio, prior to identifying the
dialog.
18. The method of claim 1, further comprising:
filtering the audio, prior to identifying the dialog.

19. The method of claim 1, comprising identifying the dialog by:
filtering the audio.
20. The method of claim 19, comprising:
filtering the audio outside of a range of from about 100 Hertz to about
1,000 Hertz.
21. The method of claim 1, further comprising:
retrieving a second stored program asset, the second asset comprising
audio encoded at a third loudness;
identifying dialog of the asset;
determining a fourth stored loudness of the dialog;
comparing the fourth loudness to the third loudness; and
re-encoding the asset at the fourth loudness, if the third loudness and the
fourth loudness are different by more than a predetermined amount.
22. The method of claim 1, comprising retrieving an asset comprising a
program, a chapter of a program, or an advertisement.
23. The method of claim 1, further comprising:
storing the asset with the re-encoded loudness setting.
24. The method of claim 1, wherein the audio is encoded at a normalized
loudness setting, the method further comprising:
normalizing the determined loudness of the dialog;

comparing the normalized determined loudness to the normalized loudness setting; and

re-encoding the asset at a second loudness setting corresponding to the normalized determined loudness if the first loudness setting and the normalized determined loudness are different by more than a predetermined amount.

25. A method of correcting an audio level of a stored program asset, comprising:
 - retrieving a stored program asset, the asset comprising audio having an encoded DIALNORM setting;
 - demultiplexing the audio from the retrieved asset;
 - decompressing the audio;
 - identifying dialog of the audio;
 - determining a DIALNORM of the dialog;
 - comparing the determined DIALNORM to the encoded DIALNORM setting;
 - re-encoding the asset at the determined DIALNORM if the encoded DIALNORM and the determined DIALNORM are different by more than a predetermined amount; and
 - storing the asset with the re-encoded DIALNORM.

26. The method of claim 25, comprising identifying dialog by:
 - dividing the audio into time intervals;
 - determining a loudness of each time interval; and
 - identifying time intervals with intermediate loudnesses.

27. The method of claim 26, comprising:
identifying time intervals with high, intermediate and low loudnesses by
creating a histogram.
28. The method of claim 25, comprising:
decompressing the audio by converting the audio into a pulse code
modulation file.
29. The method of claim 28, further comprising:
performing automatic gain control on the pulse code modulation file prior
to identifying the dialog.
30. The method of claim 25, further comprising:
filtering the audio.
31. The method of claim 25, further comprising:
correcting compression of the audio.
32. A method of processing an audio level of a stored program asset,
comprising:
retrieving a stored program asset, the asset having audio encoded at a
loudness setting;
identifying dialog of the asset;
determining a loudness of the dialog; and
comparing the determined loudness to the loudness setting.

33. A system for correcting an audio level of a stored program asset, the system comprising:

- means for retrieving a stored program asset, the asset having audio encoded at a first loudness setting;
- means for identifying dialog of the asset;
- means for determining a loudness of the dialog; and
- means for re-encoding the asset at a second loudness setting corresponding to the determined loudness, if the first loudness setting and the determined loudness are different by more than a predetermined amount.

34. The system of claim 33, further comprising:

- means for storing the asset.

35. A system for correcting an audio level of a stored program asset, the system comprising:

- memory to store the program asset, the asset having audio encoded at a first loudness setting; and

- a processor coupled to the memory, the processor being programmed to:
 - retrieve a stored program asset,
 - identify dialog of the asset;
 - determine a loudness of the dialog; and
 - re-encode the asset at a second loudness setting corresponding to the determined loudness, if the first loudness and the second loudness are different by more than a predetermined amount.

36. The system of claim 35, wherein the audio is encoded at a DIALNORM setting and the processor is programmed to:
- determine DIALNORM of the dialog.
37. The system of claim 36, wherein the processor is programmed to:
- determine a DIALNORM of the intervals in the immediate category;
38. The system of claim 35, wherein the processor is programmed to identify the dialog by:
- dividing the audio into time intervals;
 - determining a loudness of each time interval; and
 - identifying time intervals with intermediate loudnesses.
39. The method of claim 38, wherein the processor is programmed to:
- determine the loudness of each time interval based on psycho-acoustic criteria.
40. The system of claim 39, wherein the processor is programmed to:
- determine the loudness based on $L_{eq}(A)$.
41. The system of claim 38, wherein the processor is further programmed to:
- discard time intervals with high and low loudnesses.
42. The system of claim 38, wherein the processor is programmed to:
- identify time intervals with intermediate loudnesses by creating a histogram of the loudnesses of the intervals.

43. The system of claim 38, wherein the processor is programmed to:
determine a loudness of the time intervals in the intermediate category.
44. The system of claim 35, wherein the processor is programmed to:
correct compression of the audio of the program.
45. The system of claim 35, wherein the processor is further programmed to:
receive the program from a source;
store the program in memory for later transmission; and
retrieve the program from memory.
46. The system of claim 35, wherein the processor is further programmed to:
demultiplex the audio from the program.
47. The system of claim 35, wherein the processor is further programmed to:
decompress the audio.
48. The system of claim 47, wherein the processor is further programmed to:
decompress the audio by converting the audio to a pulse coded modulation
format.
49. The system of claim 35, wherein the processor is further programmed to:
perform automatic gain control on the audio prior to identifying the first
and second loudness levels.
50. The system of claim 35, wherein the processor is further programmed to:
filter the audio.

51. The system of claim 35, wherein the processor is further programmed to identify the dialog by:

filtering the audio.

52. The system of claim 35, wherein the audio is encoded at a normalized loudness setting and the processor is programmed to:

determine a normalized loudness of the dialog; and

re-encode the asset at a second loudness setting corresponding to the normalized determined loudness, if the first loudness setting and the normalized determined loudness are different by more than a predetermined amount.

53. A method of encoding audio of a program, comprising:

receiving a program, the program having audio encoded at a first loudness setting;

identifying dialog of the program;

determining a loudness of the dialog;

comparing the determined loudness to the first loudness setting; and

encoding the program for storage at the second loudness setting, if the first loudness setting and the second loudness are different by more than a predetermined amount.

54. The method of claim 53, comprising identifying the dialog by:

dividing the audio into time intervals as the audio is received;

determining a loudness of each time interval as the interval is divided; and

identifying time intervals with intermediate loudness after at least a portion of the audio of the entire program is received.

55. The method of claim 53, comprising:
determining the loudness of each time interval based on psychoacoustic criteria.
56. The method of claim 55, comprising:
determining the loudness of each time interval based on $L_{eq}(A)$.
57. The method of claim 53, further comprising:
normalizing the determined loudness of the time intervals having intermediate loudnesses.
58. The method of claim 57, wherein the normalized loudness setting is a DIALNORM setting, the method comprising determining the normalized loudness by:
determining a DIALNORM of the time intervals having intermediate loudnesses.
59. A system for encoding audio of a program, comprising:
a receiver to receive a program, the program having audio encoded at a first loudness setting; and
a processor programmed to:
identify dialog of the program;
determine a loudness of the dialog;
compare the determined loudness to the first loudness setting; and
encode the program for storage at a second loudness setting
corresponding to the second loudness, if the first loudness setting and the determined loudness are different by more than a predetermined amount.

60. A method of encoding audio of a program, comprising:
retrieving a stored program, the program comprising audio;
identifying dialog of the audio;
determining a loudness of the dialog; and
encoding the program at a loudness setting corresponding to the
determined loudness.
61. The method of claim 60, comprising identifying the dialog by:
dividing the audio into time intervals;
determining a loudness of each time interval;
identifying time intervals with intermediate loudnesses; and
determining a loudness of the time intervals with intermediate loudnesses.
62. The method of claim 60, further comprising:
transmitting the program with the encoded loudness setting.
63. The method of claim 60, comprising:
determining the loudness of each time interval based on psychoacoustic
criteria.
64. The method of claim 63, comprising:
determining the loudness of each time interval based on Leq (A).
65. The method of claim 60, further comprising:
normalizing the determined loudness of the time intervals having
intermediate loudnesses.

66. The method of claim 65, comprising determining the normalized loudness
by:

determining a DIALNORM of the intervals having intermediate
loudnesses.

67. The method of claim 60, further comprising:
determining a compression value for the audio

68. A system for encoding audio of a program, comprising:
memory to store the program, the program comprising audio; and
a processor programmed to:
retrieve the stored program;
identify dialog of the audio;
determine a loudness of the dialog; and
encode the program at a loudness setting corresponding to the
determined loudness.

69. The system of claim 68, wherein:
the processor is programmed to identify dialog by:
dividing the audio into time intervals;
determining a loudness of each time interval; and
identifying time intervals with intermediate loudnesses; and
the processor is programmed to determine the loudness of the dialog by:
determining a loudness of the time intervals with intermediate
loudnesses.

70. The system of claim 68, further comprising:
a transmitter coupled to the processor, to transmit the program with the
encoded loudness setting.
71. The system of claim 68, wherein the processor is further programmed to:
determine a compression value for the audio.